

## REMARKS

Firstly, it is respectfully requested that the examiner reconsider and withdraw the finality of the final rejection because it was not necessitated by any amendment.

Applicants' previous response filed November 15, 2007 amended claim 15 to incorporate the limitations of previously considered claim 30 and thereby represented the previously considered claim 30. Because claim 30 had previously been searched and considered that amendment raised no new issue. Claim 36 was newly added in the previous response, but no new art has been applied in rejecting claim 36.

The present amendment should be entered in any event because it only cancels claim 31 and thereby reduces the issues which would be raised on appeal.

1. The Rejection of Claims 15-24, 26, 28-29 and 31-36 for Obviousness Over Ichimura et al in View of Keane et al.

It is respectfully submitted that the teachings of Ichimura et al have little or no relevance to applicants' invention as defined by the pending claims because (1) the film forming polymer of Ichimura, contrary to the Examiner's characterization, is not a water soluble polymer, (2) as the Examiner acknowledges, the compositions disclosed by Ichimura et al contain neither an acid former nor a sensitizer and (3) the photo-reaction of Ichimura involves cross-linking by photodimerization and does not involve any reaction which is acid mediated.

A. The Examiner Mischaracterizes the Teachings of Ichimura et al.

Referring to Ichimura et al, at the bottom of page 3 of the office action, the

Examiner errs where she writes: "The film-forming polymer is a water-soluble polymer that ... ". The compositions of Ichimura et al are repeatedly described by Ichimura et al, e.g. at column 2, lines 57-59, as "an aqueous emulsion of a film-forming resin." An emulsion, by definition, is "a mixture of two immiscible (unblendable) substances." If the film-forming polymer of Ichimura et al were water-soluble, as asserted by the Examiner, it would dissolve in the aqueous phase and there would be no emulsion. See attachment #1.

Ichimura et al neither disclose an acid former and a sensitizer nor suggest an acid-reactive insolubilizing agent dissolved or dispersed in water for converting the water-soluble resin into an insoluble form in the presence of an acid. Ichimura et al pertain to an improvement of a photosensitive composition containing saponified PVA and a styrylpyridinium or styrylquinolinium salt grafted onto the PVA (column 1). As taught in the Abstract, the improved composition is a photosensitive aqueous emulsion of a film-forming resin and a protective colloid. The protective colloid includes a PVA derivative having a PVA backbone to which an amorphous unit and a photosensitive unit are bonded. The PVA derivative is grafted onto the film-forming resin. As shown in column 3, the photosensitive unit has a structure represented by the formula (I) in which Y is a group represented by the formula (II) or (III) (containing a styrylpyridinium or styrylquinolinium salt). Upon irradiation, the photosensitive unit undergoes photodimerization (column 1) so that the film-forming resin is cross-linked. Thus, the photosensitive unit does not insolubilize the film-forming resin through an action of an acid. Further, the film-forming resins disclosed in column 7, lines 31-35 are water-

insoluble. As a result of grafting of a saponified PVA, the film-forming resin is present in water in the form of a stable emulsion (column 7, lines 43-45 and 56-58).

**B. The Ichimura et al and Keane et al References Are Not Properly Combinable**

It is not appropriate to combine Ichimura et al and Keane et al in which the photo reactions proceed by different mechanisms. Keane et al do not utilize cross-linking by photodimerization as in Ichimura et al. In Keane et al, a cross-linking agent is activated by a catalyst (acid generator) upon irradiation to cross-link the film-forming resin. It would have been nonsensical for one skilled in the art to add an acid former to the emulsion of Ichimura et al which does not undergo any acid mediated reaction.

**C. Even If Combinable, the Combination of Ichimura et al and Keane et al Would Not Lead to the Present Invention**

Even if Ichimura et al and Keane et al were to be combined as envisioned by the examiner, the resulting composition would still lack the solid phase acid-reactive insolubilizing agent and the water-soluble resin dissolved in water.

The compositional relationship between the claimed invention and Keane et al is as follows:

Invention	Keane
water	water
solid acid former	latent catalyst in solution
water-soluble resin	water-soluble resin
solid sensitizer	sensitizer (optional)
insolubilizing agent	trimethylol cross-linking agent

Whereas the acid former is dispersed as solid particles in the claimed invention, the latent catalyst of Keane et al is present in the form of colloidal droplets of a solution. At column 4, lines 35-63, Keane et al disclose that the catalyst is insoluble in water and is preferably added as a concentrated solution because the catalyst is in a molecularly dispersed state during the irradiation step. Although, as pointed out by the examiner, Keane et al, at column 4, lines 64-66, teach that, if desired, the catalyst can be added in finely powdered or colloidal state, this description is considered to be related to a method of preparation and is not considered to mean that the catalyst can be present in finely powdered or colloidal state during the irradiation step, i.e. in the photosensitive composition, since otherwise that teaching would contradict the teachings at column 1, lines 53-55, in the working examples, in claim 1, etc. A molecularly dispersed state as required by Keane et al would not be obtainable by using a solid phase particle catalyst.

Whereas in the present invention the sensitizer is dispersed as solid particles in the claimed composition, Keane et al is silent in this respect. The examiner asserts at page 4 of the office action that it is obvious that the sensitizer is in the form of particles because Keane et al teach that the sensitizer is dispersed in the emulsion. Applicants strongly disagree with that assertion. First, Keane et al do not teach that the sensitizer is dispersed in the emulsion. Keane et al merely teach that the sensitizer may be contained in the emulsion. Second, and more importantly, the examiner apparently ignores the function of the sensitizer. The sensitizer is used to sensitize the acid former (catalyst). Those skilled in the art would not have expected the acid former to be sensitized by a solid phase sensitizer, through a solid-solid interaction.

As taught in paragraph [0054] of applicants' substitute specification, it has been accepted in the art that in order for an electron transfer reaction or an energy transfer reaction, e.g. the sensitization reaction, to take place, it is necessary that the intermolecular distance between a molecule which gives electron or excitation energy (donor molecule) and a molecule which receives the electron or excitation energy (acceptor molecule) should be no more than about 10 angstroms. For this reason, it has been the general practice that the donor molecule and the acceptor molecule are combined into the same molecule, or are dissolved in a molecular concentration higher than a predetermined level. It was therefore surprising that the radiation sensitized reaction in the present invention occurs at a high rate, even though the photo-acid former and the sensitizer are dispersed as solids in the composition of the present invention.

Keane et al suggest the use of a sensitizer which is customarily present in surface-coating emulsions. Thus, it is considered that, in Keane et al, the sensitizer is contained in the emulsion by being dissolved in the droplets of a solvent solution. Keane et al do not disclose or suggest any reason or motive to employ a solid-solid interaction for sensitizing the catalyst.

In the present invention, the acid former functions as an electron acceptor. Therefore, an electron donor is used as the sensitizer. As shown in page 124 of attachment #2, there are three different sensitization mechanisms, i.e. (1) energy transfer, (2) electron transfer, and (3) free radical-induced decomposition. The present invention uses (2) sensitization by electron transfer. Therefore, it is apparent that the types of the acid former compounds and sensitizer compounds and reaction conditions

will differ depending upon the sensitization mechanism. Keane et al neither disclose a sensitizing mechanism nor suggest reaction conditions. Again, it would have been contrary to the common understanding in the field of chemistry to disperse both of the catalyst and sensitizer in the form of solid particles.

It is generally accepted that photoelectron transfer-induced sensitization proceeds in a manner illustrated in FIG. 2.1 of attachment #3. Namely, when a solution in which an electron donor (D) and an electron acceptor (A) are dissolved is irradiated, the electron donor (D) is photo-excited to (D<sup>\*</sup>). When acceptor (A) comes close to excited donor (D<sup>\*</sup>), electron transfer takes place therebetween to form a solvated ion pair (D<sup>+</sup>...A<sup>-</sup>) or a contact ion pair (D<sup>+</sup>A<sup>-</sup>).

In the case of the present invention, the acid former is an electron acceptor (A) while the sensitizer is an electron donor (D). They are insoluble or sparingly soluble in water and are present as solid particles in water. The present inventors are the first to find that the radiation sensitized reaction will occur at a high rate through a solid-solid interaction between the acid former and the sensitizer dispersed in an aqueous phase containing no organic solvent.

2. The Rejection of Claims 15 and 25 Under 35 USC 103(a) as being unpatentable over Ichimura et al, Keane et al, Kawamura et al and Zampini

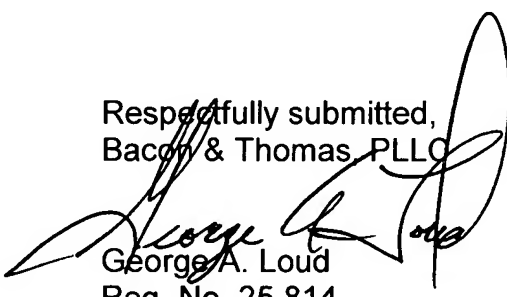
This rejection is traversed for the same reasons given above. The Examiner's explanation of the rejection indicates that Kawamura et al and Zampini are cited merely for their teachings of particle size and, given the fact that claim 15 recites no particle size, the application to claim 15 is not understood. Regarding claim 25, which depends

from claim 15, the citations of Kawamura et al and Zampini do not appear to be relevant to the deficiencies of the basic combination of Ichimura et al and Keane et al discussed above.

In conclusion, it is respectfully requested that the examiner reconsider the rejections of record in light of the foregoing analysis.

Also submitted herewith is a form 1449 listing the three "attachments". If the submission of these attachments must be regarded as an IDS under 37 CFR 1.97(d) or (c), please charge the fee required by 37 CFR 1.17(p) to deposit account No. 02-0200.

Respectfully submitted,  
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